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ABSTRACT

Following a test and answer sheet for pretesting/posttesting purposes related to the film "Raindrops" (focusing on the ecology of, and electric development along, the banks of North Carolina's Catawba River), seven activities are outlined as possibilities for helping students gain a fuller understanding of the river and its development. The content area emphasized, objective, and instructional strategies are provided for each activity. Materials required (maps, charts, puzzles, worksheets) are included as part of the activity or call for use of readily available library sources such as the "World Almanac." Five suggestions for further enhancing the study of the Catawba River and answers to questions are also included. (Author/JN)

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RAINDROPS

TEACHERS GUIDE

ED218160

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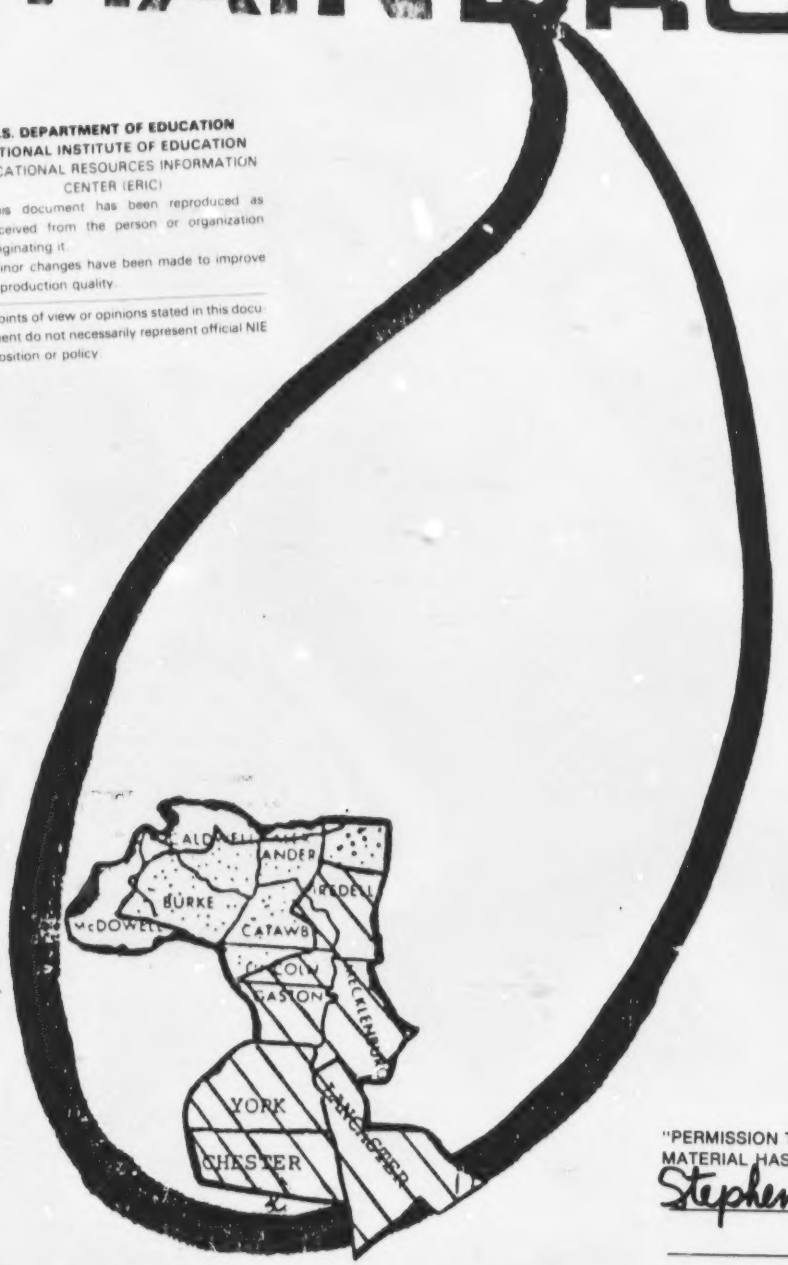

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RAINDROPS

SYNOPSIS: Following a single raindrop from the face of Grandfather Mountain high in North Carolina's Blue Ridge, the film observes electric development along the banks of the Catawba River. The ecology of the area is pictured in the plants and animals which call the river home. All the lakes along the Catawba have been built by Duke Power Company and Duke's use of the lakes is explained.

VOCABULARY: The thirteen (13) words or terms listed below are key to understanding the meaning of the film. Vocabulary activities to help teach these terms are found later in this guide.

-inanimate	-hydroelectric	-efficiency
-communicate	-generators	-precipitators
-watershed	-peaking power	-limnologists
-drainage arc	-condensers	-reforestation
	-waterfowl refuge	

Pre-and post-test

Administer the same test and compare scores from the two times.

TEST

The following questions are to be answered on the answer sheet. Please make no marks on the test.

1. Water is necessary to sustain life on earth.
   a. true b. false

2. Which of the following directions gives an accurate description of the beginning of the Catawba River?
   a. near Asheville b. near Lenoir
   c. on northeast of Grandfather Mt. d. on southeast of Mt. Mitchell

3. Which of the following Indian tribes did not live in the Catawba Valley?
   a. Cherokee b. Catawba
   c. Pamlico d. Wateree

4. Which river joins with the Catawba to form Lake James?
   a. Green b. Broad
   c. Yadkin d. Linville

5. What was the year when the dam forming Lake James was built?
   a. 1904 b. 1916
   c. 1957 d. 1932

6. Who envisioned harnessing the Catawba for power?
   a. J.B. Duke b. W. Gil Wylie
   c. W.S. Lee d. A. H. Norman

7. There were no dams on the Catawba or its tributaries prior to Duke---
   a. true b. false

8. When was the Catawba's first Duke Power dam built?
   a. 1904 b. 1916
   c. 1957 d. 1932

9. How many miles of shore line does Lake Norman have?
   a. 1000 b. 500
   c. 250 d. 125

10. Which of the following are uses to which the lakes are put?

    a. cool steam b. cities drinking water
    c. recreation d. all of above

11. Approximately how many cities and towns draw their drinking water from the Catawba or its lake?
    a. 8 b. 39
    c. 19 d. 5

12. Which Duke steam station, located on Lake Norman, was number one in efficiency in the country for nine consecutive years?
    a. Belews Creek b. Marshall
    c. Buck d. Cliffside

13. What device removes flyash from the stack of coal-fired generating stations?
    a. scrubbers b. condensers
    c. electrostatic precipitators d. none of above

-cont-

14. What nuclear station will be on the Catawba River in North Carolina?
    a. McGuire
    b. Cherokee
    c. Catawba
    d. Oconee

15. What nuclear station will be on the Catawba in South Carolina?
    a. McGuire
    b. Cherokee
    c. Catawba
    d. Oconee

16. What is the purpose of reforestation?
    a. to prevent erosion
    b. to provide wildlife habitat
    c. to provide timber
    d. all of above

17. Where do fall and winter begin in the Catawba Valley?
    a. highlands
    b. lowlands

18. Where do spring and summer begin in the Catawba Valley?
    a. Highlands
    b. lowlands

19. What permanent population does the wildlife refuge on Mountain Island Lake support each winter?
    a. Canada geese
    b. comorants
    c. purple martins
    d. bald eagles

20. Where does the water from the Catawba finally go?
    a. Pacific Ocean
    b. Gulf of Mexico
    c. Atlantic Ocean
    d. Lake Norman

ANSWER SHEET - RAINDROPS

Choose the one best answer from among the choices listed.

1. a b

2. a b c d

3. a b c d

4. a b c d

5. a b c d

6. a b c d

7. a b

8. a b c d

9. a b c d

10. a b c d

11. a b c d

12. a b c d

13. a b c d

14. a b c d

15. a b c d

16. a b c d

17. a b

18. a b

19. a b c d

20. a b c d

Activities

The following activities are listed as possibilities for helping students gain a fuller understanding of the Catawba River and its development. Most materials are provided as a part of the activity or call for use of readily available library sources such as World Almanac, Information Please Almanac, etc. Teachers should feel free to duplicate any material within this guide for classroom use.

* Contents *

Activity Title	Page
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River Basins and Development

AREA: Geography/environment

OBJECTIVE: To develop an awareness of relative sizes of the river basins in the Duke Power service area and the development upon the various basins.

ACTIVITY: 1. Provide each student with copies of the map of the service area showing the river basins. (M-1) and the station map (M-2)

2. If the age of the students allows, then have them color the areas (M-1) so that they get a better visual image of the drainage areas.

3. Using the service area map (M-1) and station map (M-2) complete the worksheet (W-1) by filling in the plants found in the various basins. The first item is completed as an example and all the basins are given for ease in completion.

4. Using M-1, M-2, and W-1, students should answer the following questions.

a. Which basin is the largest in total area?

b. Which is the smallest basin?

c. Which basin has the most hydroelectric stations?

d. Which has the most coal steam stations?

e. Which will have the most nuclear stations?

N
VIRGINIA
N. C.
DAN RIVER
WINSTON-SALEM
DURHAM
TENN.
N. C.
HICKORY
YADKIN
High Rock Lake
Lake Norman
DUKE POWER SERVICE AREA
SHELBY
CHARLOTTE
C.
C.
Lake Jocassee
Lake Keowee
SPARTANBURG
GREENVILLE
Lake Wylie
CATAWBA
N. C.
S. C.
Hartwell Reservoir
ANDERSON
Wateree Reservoir
BROAD RIVER
RIVER
COLUMBIA
RIVER BASINS
DAN
YADKIN
CATAWBA
BROAD
UPPER SAVANNAH
10 0 10 20 30 40
SCALE IN MILES

9

M-1

10

VIRGINIA
TENNESSEE
NORTH CAROLINA
GEORGIA
SOUTH CAROLINA
MOUNT AIRY
EDEN
PILOT MTN
BELEWS CREEK
MADISON
DAN RIVER
ELKIN
KING
REIDSVILLE
RURAL HALL
WALNUT COVE
N. WILKESBORO
GREENSBORO
BURLINGTON
GRAHAM
MEBANE
YADKINVILLE
KERNERSVILLE
HILLSBOROUGH
WINSTON-SALEM
GIBSONVILLE
DURHAM
LENOIR
TAYLORSVILLE
HARMONY
MOCKSVILLE
ADVANCE
JAMESTOWN
CHAPEL HILL
OXFORD
HIGH POINT
RANDLEMAN
RHODHISS
BRIDGEWATER
LOOKOUT SHOALS
THOMASVILLE
VALDESE
TROUTMAN
BUCK
HICKORY
MORGANTON
CONOVER
SALISBURY
MARION
CHINA GROVE
OLD FORT
MARSHALL
MOORESVILLE
COWANS FORD
DAVIDSON
ROCKWELL
KANNAPOLIS
LAKE LURE
LINCOLNTON
McGUIRE
(under construction)
RUTHERFORDTON
RIVERBEND
TURNER
SPINDALE
BESSEMER CITY
MOUNTAIN ISLAND
ALBEMARLE
HENDERSONVILLE
MOORESBORO
ALLEN
MT. HOLLY
TUXEDO
SHELBY
GASTONIA
BELMONT
NORWOOD
TRYON
CLIFFSIDE
GASTON SHOALS
CHARLOTTE
SREVARD
LANDRUM
CLOVER
MATTHEWS
INMAN
CHESNEE
BLACKSBURG
CATAWBA
(under construction)
CHEROKEE
(under construction)
YORK
FORT MILL
MARSHVILLE
JOCASSEE
TRAVELERS REST
NINETY-NINE ISLANDS
WYLIE
WAXHAW
OCONEE
KEOWEE
GREER
LYMAN
SPARTANBURG
PICKENS
GREENVILLE
CLEMSON
SALUDA
SIMPSONVILLE
CHESTER
LANCASTER
LIBERTY
FISHING CREEK
KERSHAW
WALHALLA
PIEDMONT
WOODRUFF
GREAT FALLS
WILLIAMSTON
GREAT FALLS
DEARBORN
PENDLETON
FOUNTAIN INN
ROCKY CREEK
CEDAR CREEK
LEE
HOLLIDAY'S BRIDGE
BELTON
ANDERSON
WHITMIRE
HONEA PATH
LAURENS
WATEREE
GREENWOOD
IVA
BUZZARD'S ROOST
(Leased)
HYDRO
COAL
NUCLEAR

11

12

	Basin	Plant	Fuel Type
ex. 1	Dan	Dan River	Coal
2			
3	Yadkin		
4	Catawba		
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22	Broad/Saluda		
23			
24			
25			
26			
27			
28			
29			
30			
31			
32	Upper Savannah		
33			
34			

Total Hydro: Total coal_____ Total nuclear_____

As The River Runs

AREA: Math

OBJECTIVE: To learn to measure accurately and to gain practice in arithmetic computations.

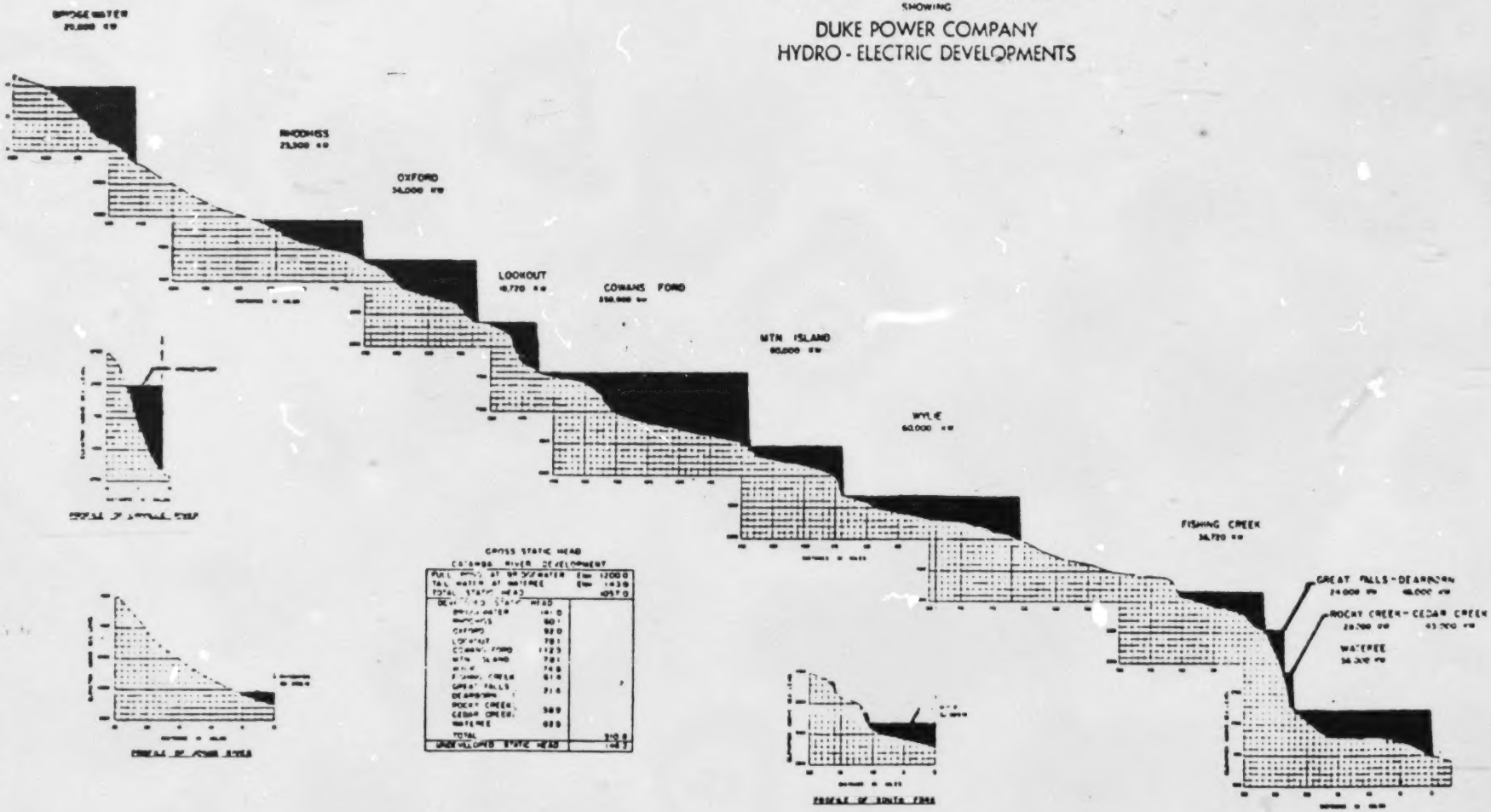
ACTIVITY:

1. Provide each student a copy of Plan - Profile of Catawba River (M-3), worksheet (W-2)

2. Have each student measure (using a metric ruler) the height of each of the dams and the distance water is backed up behind the dam.

3. Record the data from these measurements on the worksheet (W-2) in the proper places. The first one has been done as an example. (Remember there are two separate scales: ft. for height and miles for distance.)

PLAN – PROFILE of CATAWBA RIVER
SHOWING
DUKE POWER COMPANY
HYDRO - ELECTRIC DEVELOPMENTS



0 10 15 20 25 30 40

SCALE IN MILES
[1 mm = 0.9 mi.]

[vertical distance]

0 150 100 200 300

SCALE in feet
[1 mm = 10 ft.]

[horizontal distance]

15

16

WORKSHEET - RIVER RUNS

	Dam	Depth at Dam (ft.)	Back-up Distance (miles)
ex 1.	Bridgewater	130	14
2.	Rhodhiss		
3.	Oxford		
4.	Lookout		
5.	Cowans Ford		
6.	Mountain Island		
7.	Wylie		
8.	Fishing Creek		
9.	Great Falls-Dearborn		
10.	Rocky Creek Cedar Creek		
11.	Wateree		

* Problems *

1. How much higher is the dam at Bridgewater than the dam at Wateree?

2. How much longer is the back-up at Cowans Ford than Fishing Creek?

3. Assume the river bed is a constant slope. What would be the height of a dam at Watree to impound water at the same depth as now in the upper reaches of Bridgewater? Add the heights of the existing dams as you determined them above. Does this calculation equal your pretend calculation? Explain.

TO DRAIN A LAKE

AREA: Geography/environment, math

OBJECTIVE: To develop an awareness of relative sizes of the drainage areas for lakes on the Catawba River, and to perform some mathematical exercises using data related to drainage areas.

ACTIVITY:

1. Provide each student with copies of the map showing lake drainage (M-4) and the Lake Drainage Worksheet (W-3)

2. Have the student to color or differentially shade the basins so that visual comparisons can be made.

3. Using the table found on M-4, do the required mathematical manipulations.

NOTE: Assume all rainfall reaches the intended lake.

CATAWBA RIVER BASIN

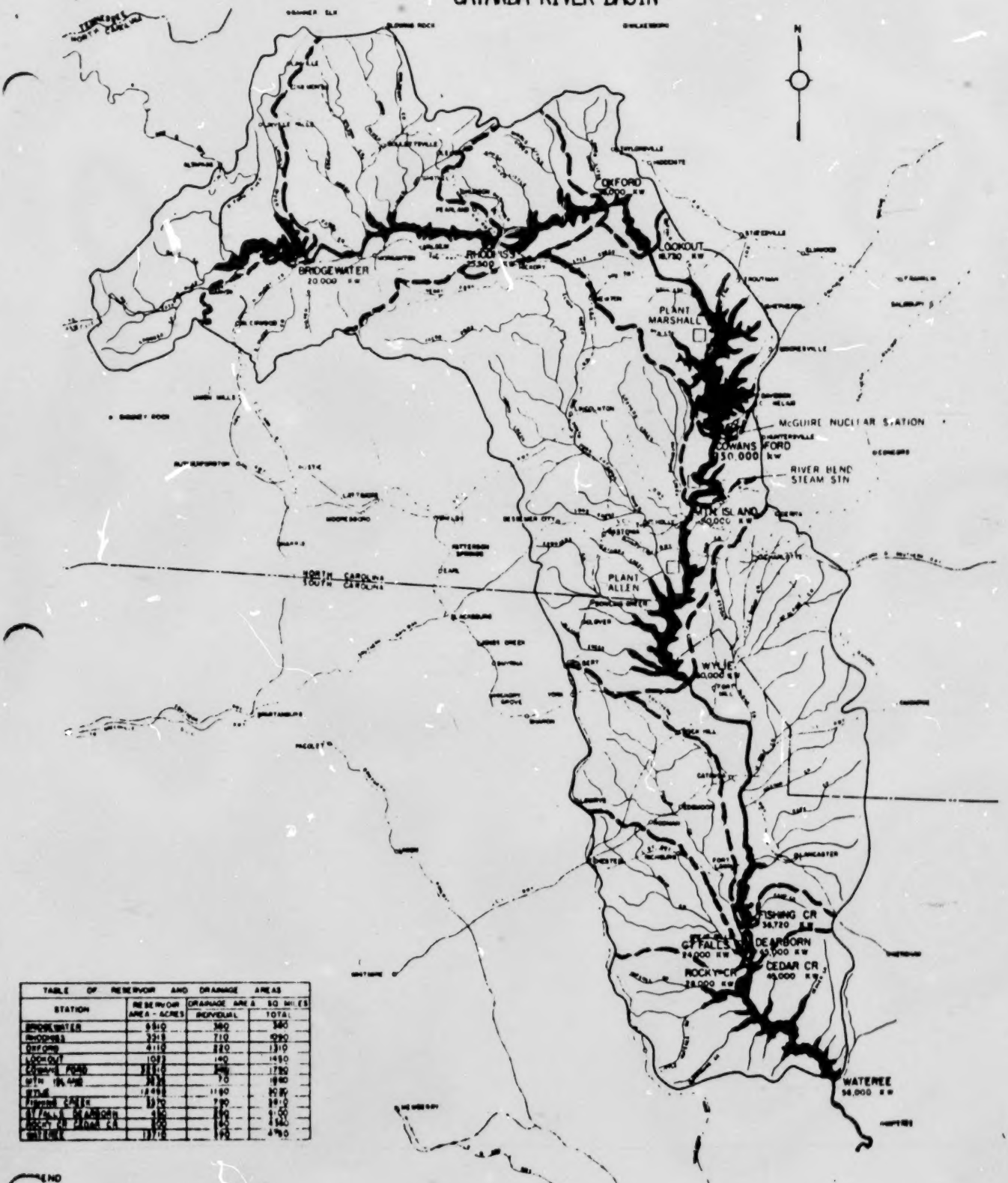


TABLE OF RESERVOIR AND DRAINAGE AREAS			
STATION	RESERVOIR AREA - ACRES	DRAINAGE AREA SQ MILES	
		INDIVIDUAL	TOTAL
BRIDGEWATER	6510	380	380
RHODHISS	3215	719	1099
OXFORD	4110	220	1319
LOOKOUT	1083	140	1459
[illegible]	[illegible]	[illegible]	1730
[illegible]	[illegible]	70	1800
[illegible]	[illegible]	1190	2990
[illegible]	[illegible]	700	3690
[illegible]	[illegible]	[illegible]	3900
[illegible]	[illegible]	[illegible]	4040
[illegible]	[illegible]	[illegible]	4190

LEGEND

- HYDRO STATION
- FOSSIL STEAM STATION
- NUCLEAR STEAM STATION

CAPACITIES ARE NAMEPLATE KWs

DUKE POWER COMPANY

SCALE IN MILES

WORK SHEET - LAKE DRAINAGE

Given: 1 sq. mi. = 640 acres

1 ft. of water covering 1 acre = 1 acre-foot

(Note: assume that all of the rainfall eventually reaches the intended lake)

1. If 6" of rain falls in the drainage basin for Bridgewater dam, how much water will have to be contained in the Rhodhiss reservoir? How much will this raise the water at the Rhodhiss dam?

2. If water at the Cowans Ford dam is 8 feet below the top and there is 7" of rainfall in all the reservoir drainage areas above Cowans Ford (i.e., Bridgewater, Rhodhiss, Oxford, and Lookout) will Lake Norman which is formed by Cowans Ford be able to contain the water without overflowing the dam?

3. How many acre-feet of water will be produced by 1" of rainfall throughout the entire Catawba basin?

4. If there are 1,093,600 acre-feet of water in the Cowans Ford reservoir, what is the average depth of the reservoir?

5. If the total acre-feet of all the reservoirs is 2,346,441 what would be the average depth of the lakes on the Catawba assuming each of equal depth?

DAM TIMELINES

AREA: History; Math

OBJECTIVE: To gain knowledge of when the various dams were built and to graph the increase in hydroelectric generated power over time.

ACTIVITY:

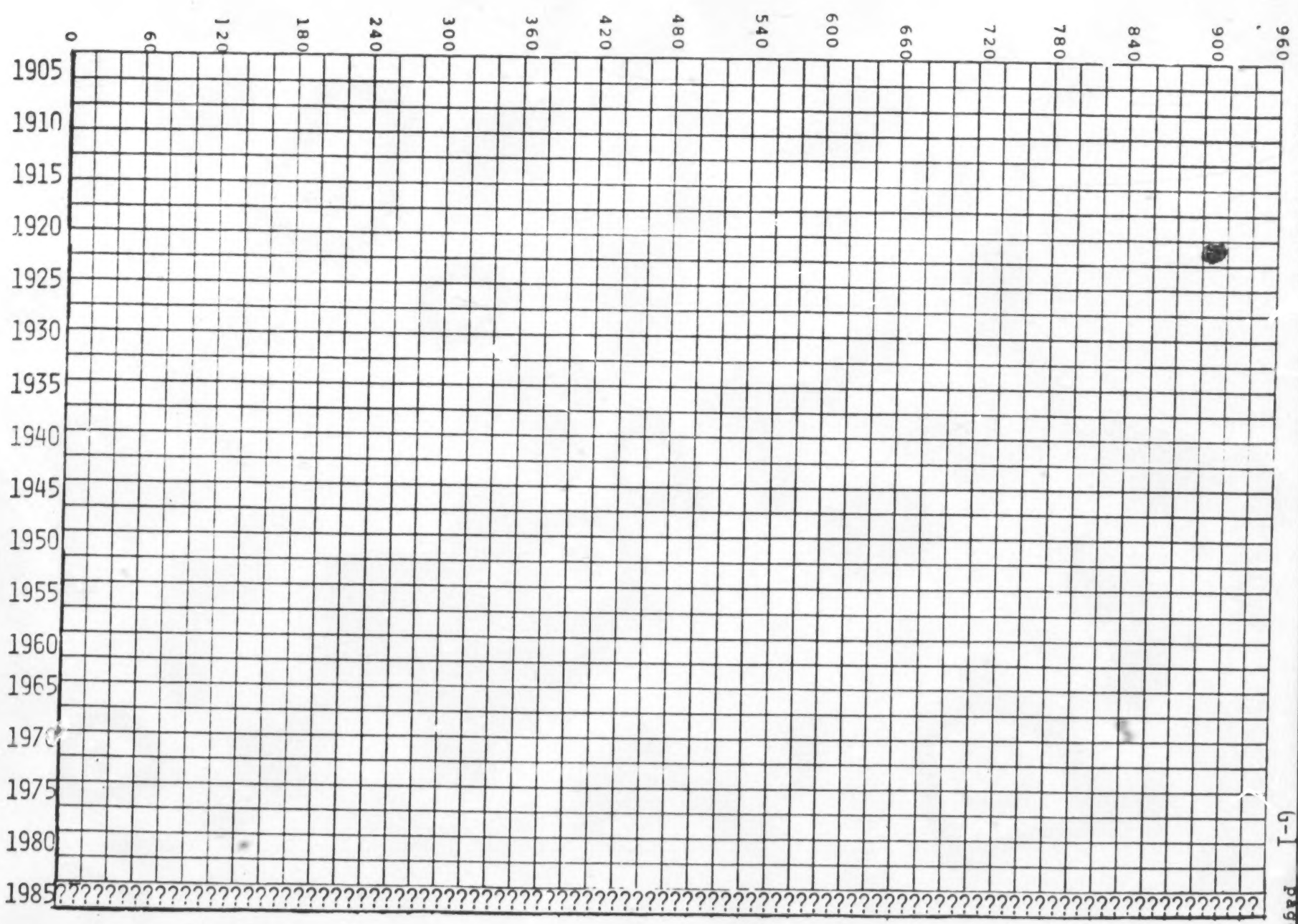
1. Provide each student with copies of "Hydroelectric Data" (D-1) and the graph (G-1). Note: Teachers may prefer to have students furnish their own graph paper.

2. Prepare a timeline showing the plants as they were built (note that Duke was not the original owner in a few cases).

3. Using either the prepared graph or the student's graph paper, list the total megawatts (mw) for the years listed.

NOTE: A film about the history of Duke Power might fit in this activity - it's title - "Impossible Is Not An American Word." It is available from Educational Services, (704) 373-8537 or P. O. Box 33189, Charlotte, N. C. 28242 or (704) 373-8323.

AME	ACRES (x1000)	NAMEPLATE CAPACITY (MW)	RIVER SYSTEM	FULL POND ELEVATION (ft msl)	YEAR
AKE TAHOMA	0.16	0.24	Catawba-Wateree	1401.3	1928
RIDGEWATER	6.5	20.0	Catawba-Wateree	1200.0	1919
HODHISS	3.3	25.5	Catawba-Wateree	995.1	1925
KFORD	4.1	36.0	Catawba-Wateree	935.0	1928
OOKOUT SHOALS	1.0	18.7	Catawba-Wateree	838.1	1915
OWANS FORD	32.5	350.0	Catawba-Wateree	760.0	1963
OUNTAIN ISLAND	3.2	60.0	Catawba-Wateree	647.5	1923
PENCER MOUNTAIN	0.07	.64	Catawba-Wateree	634.7	1905
'LIE	12.5	60.0	Catawba- Wateree	569.4	1925
ISHING CREEK	3.4	36.7	Catawba-Wateree	429.2	1916
REAT FALLS		24.0			1907
EARBORN		45.0			1923
POUNDMENT FOR GREAT FALLS AND DEARBORN IS SHARED					
	0.3		*Catawba-Wateree*	*355.8*	
OCKY CREEK		28.0			1909
EDAR CREEK		45.0			1926
POUNDMENT FOR ROCKY CREEK AND CEDAR CREEK IS SHARED					
	0.3		*Catawba-Wateree*	*284.4*	
ATEREE	13.7	56.0	Catawba-Wateree	225.5	1919


TOTAL MEGAWATTS
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985

VOCABULARY ACTIVITIES

AREA: All areas

OBJECTIVE: To facilitate learning the vocabulary used in the film "Raindrops."

ACTIVITY: There are a number of activities which can be used to facilitate learning the vocabulary. Four vocabulary activities form a part of this section.

1. Magic Square
2. Word Puzzle
3. Configuration
4. Word Jumble

"Magic Square"

DIRECTIONS: Select from the answer column at the left the word or phrase which best defines or answers each of the statements at the right. Put the number of the word in the proper space in the Magic Square box. If your answers are correct, they will form a square in which the numbers in both columns and rows are equal.

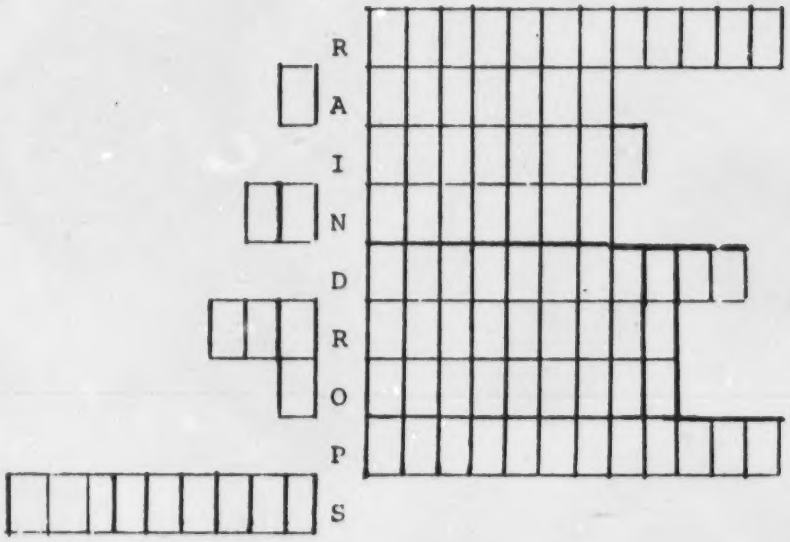
1. inanimate	A. person who studies water
2. communicate	B. devices used to cool steam
3. efficiency	C. devices used to produce electric current
4. watershed	D. talk, be in touch
5. hydroelectric	E. devices used to remove flyash
6. generators	F. area from which a river or lake water comes
7. peaking power	G. process of replanting trees
8. condensers	H. power needed at highest demand levels
9. precipitators	I. electricity produced by falling water
10. limnologists	
11. waterfowl refuge	
12. reforestation	
13. drainage area	

A	B	C
D	E	F
G	H	I

Magic number is:___ _____ _ _

Word Puzzle

DIRECTIONS: From the word list below, fill in the proper words in the word puzzle to complete the boxes.



inanimate

communicate

watershed

drainage area

hydroelectric

generators

peaking power

condensers

efficiency

precipitators

limnologists

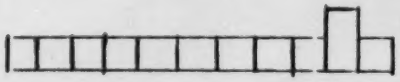
reforestation

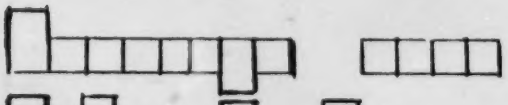
waterfowl refuge

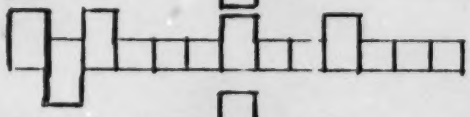
CONFIGURATION

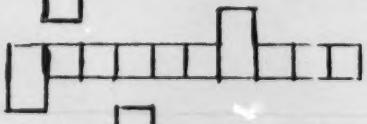
DIRECTIONS: Discover the facts about some of the "Raindrops" vocabulary by matching the names to the description and the boxes designed for their shapes.

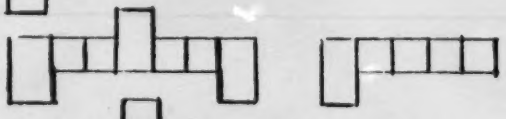
1.
not alive

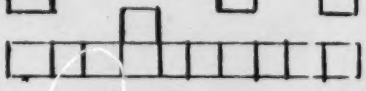
2. 
to talk

3. 
section in which water flows to a particular lake.

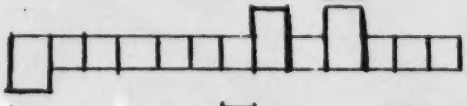
4. 
using water to generate electricity

5. 
produces electricity

6. 
energy for very highest demands

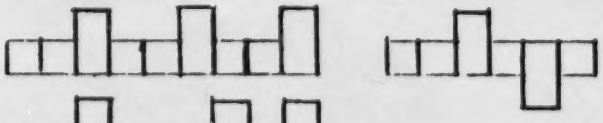
7. 
devices to cool steam

8.
ratio of work in to work out

9. 
devices to remove fly ash from smoke gases

10.
people who study fresh water

11.
process of replanting trees

12. 
site where water birds are protected

13.
area from which a river's water comes

Word list:

communicate
condensers
drainage area
efficiency
generators
hydroelectric
inanimate
limnologists
peaking power
precipitators
reforestation
waterfowl refuge
watershed

WORD JUMBLE

DIRECTIONS: Each of the jumbled words below deals with the film "Raindrops." The short definitions beside the jumble should help you unjumble the words.

1. Tamenanii: - - - - - - - - - - not alive

2. Sednernocs: - - - - - - - - - devices to cool steam

3. Ronratgese: - - - - - - - - - produces electricity

4. Dehsretaw: - - - - - - - - - - area from which a river's water comes

5. Chiyrdtrcoeel: - - - - - - - - electricity from water

6. Tatfersernooi: - - - - - - - - replanting trees

7. Fyencciife: - - - - - - - - - ratio of output to input

8. Srotaterpicpi: - - - - - - - - devices to remove flyash

9. Stsigolonmil: - - - - - - - - people who study water

10. Kingpea Rewop: - - - - - - - - power for highest demands

11. Egdrnaia aera: - - - - - - - - synonym of #4

12. Lofwertaw gefire: - - - - - - safe place for water birds

13. Etacinummoc: - - - - - - - - to talk

PEOPLE, PEOPLE EVERYWHERE

AREA: history, math, environment

OBJECTIVE: To determine the growth along the river counties and to gain practice in plotting data graphically.

ACTIVITY:

1. Provide each student with either population worksheet (W-4) and instructions to take it to the library and complete it or if library research is not desirable provide a copy of TG-1.

2. After the data has been obtained - using graph (G-2) or the student's graph paper, plot the county population for 1970 and 2020 side by side.

3. On graph (G-3) or students paper, plot the population of your country over time; also plot Mecklenburg and Chester over time; Discuss similarities and differencies.

POPULATION WORKSHEET

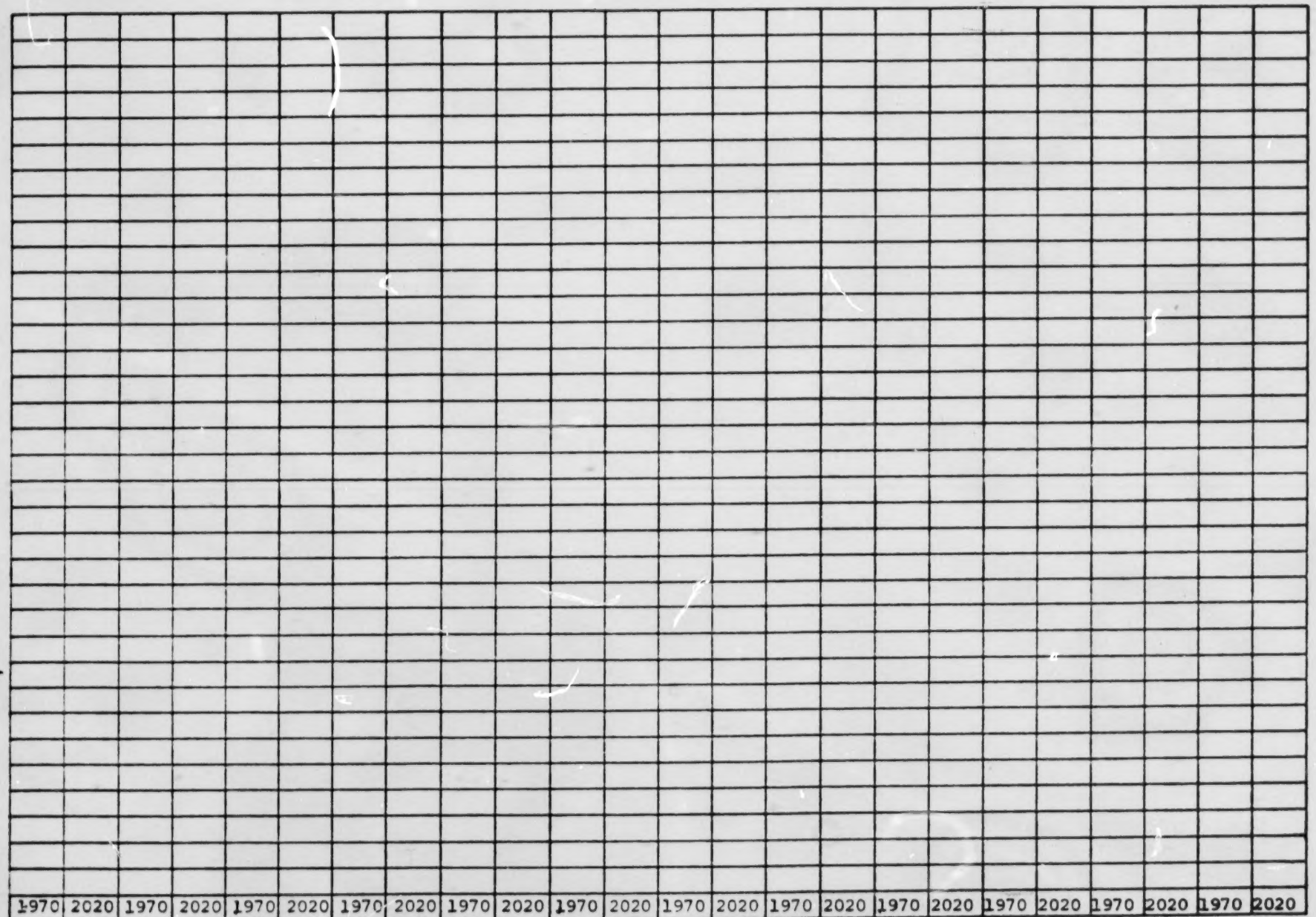
Counties	1940	1950	1960	1970	2020 (est.)
McDowell					61,000
Burke					110,500
Caldwell					101,000
Alexander					41,500
Catawba					198,000
Iredell					136,000
Lincoln					54,500
Mecklenburg					900,000
Gaston					300,000
York					160,000
Chester					37,000
Lancaster					80,000
Totals					2,079,500

POPULATION DATA

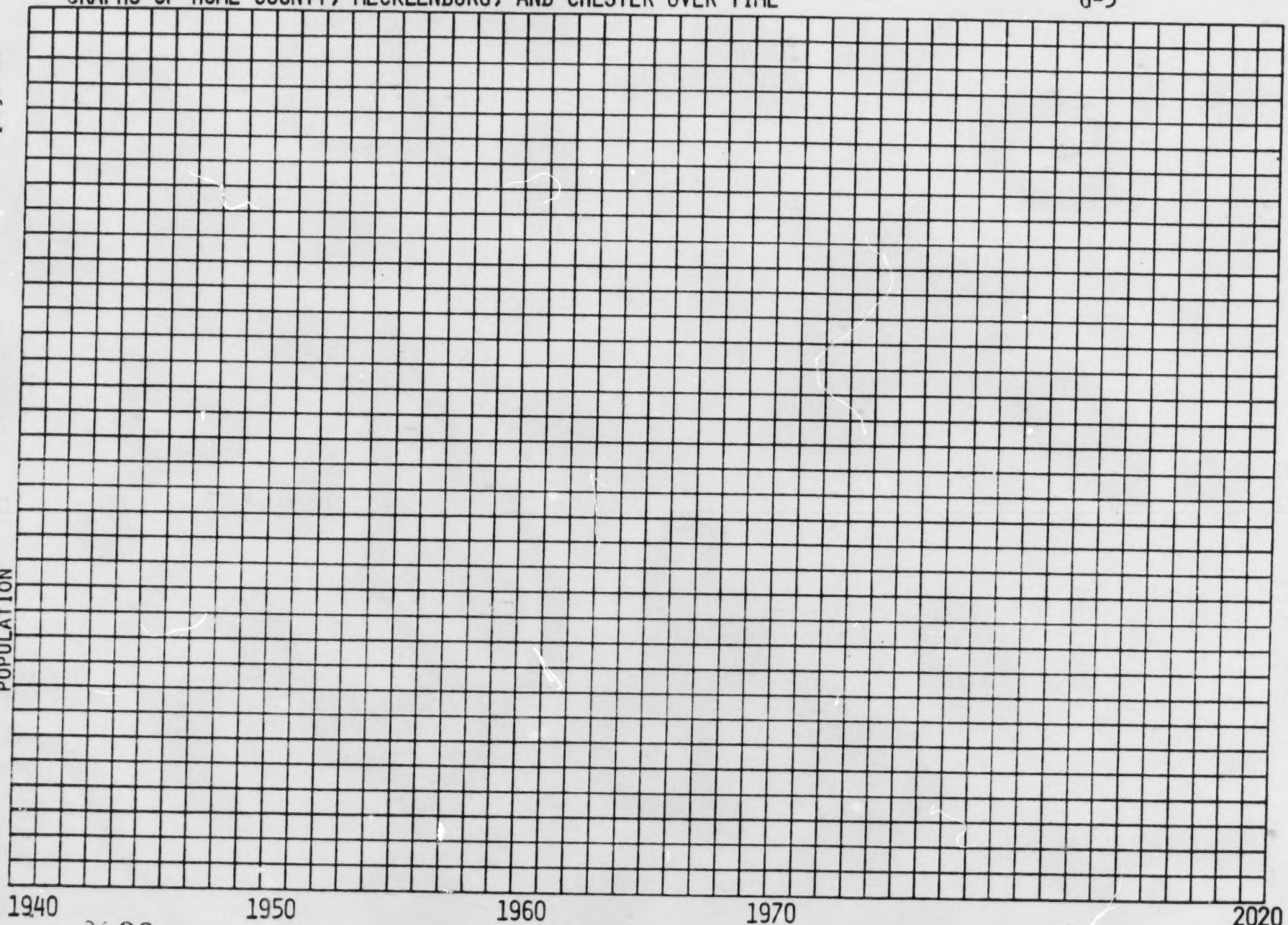
County	1940	1950	1960	1970	2020 (est.)
McDowell	23,000	25,700	26,700	30,600	61,000
Burke	38,600	45,500	52,700	60,400	110,500
Caldwell	35,800	43,400	49,500	56,700	101,000
Alexander	13,500	14,600	15,600	19,500	41,500
Catawba	51,700	61,800	73,200	90,900	198,000
Iredell	50,400	56,300	62,500	72,200	136,000
Lincoln	24,200	27,500	28,800	32,700	54,500
Mecklenburg	151,800	197,000	272,000	354,700	900,000
Gaston	87,500	110,800	127,100	148,400	300,000
York	58,700	71,600	78,800	85,200	160,000
Chester	32,600	32,600	30,900	29,800	37,000
Lancaster	32,500	37,100	39,400	43,300	80,000
Totals	600,300	723,900	857,200	1,024,400	2,079,500

COUNTY POPULATIONS (1970 AND 2020)

G-2



GRAPHS OF HOME COUNTY, MECKLENBURG, AND CHESTER OVER TIME G-3



"LIFEING" DOWN THE CATAWBA

AREA: geography, biology, environment

PURPOSE: To gain an understanding of the life (particularly the plant life) which might be found along the river.

ACTIVITY:

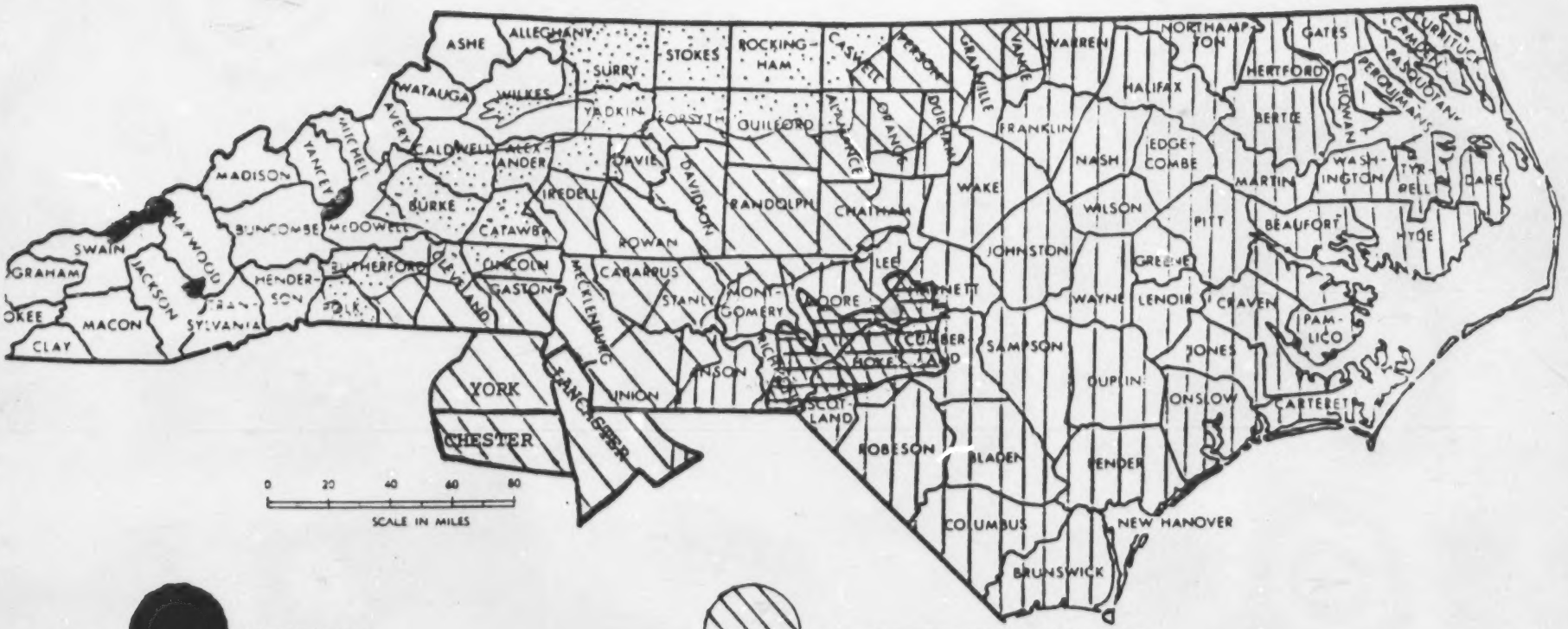
1. Provide the students with vegetation map (M-5) or make a transparency so the students can see it.

2. Obtain a leaf identification guide from the county agent, 4-H agent, or the library. Attempt to identify 15 trees which live along your part of the basin. Check the map to see if they fit the general categories listed for your county.

3. Using the pamphlet "Flowers of the Catawba River Valley" try to identify the flowers you see around you.

NOTE: If the season doesn't allow leaves or flowers to be observed, create flash cards or a matching game where students will at least become familiar with names and pictures.

* NATURAL VEGETATION MAP OF NORTH CAROLINA AND 3 SOUTH CAROLINA COUNTIES *



SPRUCE-FIR

MOUNTAIN FOREST COMPLEX

OAK-HICKORY-VIRGINIA PINE

OAK-HICKORY-SHORTLEAF PINE

OAK-HICKORY-LOBLOLLY PINE-SWAMP

LONG LEAF PINE-OAK

39

ADAPTED FROM Atlas of North Carolina, 1967 (UNC Press)

40

Additional Suggestions

The following suggestions are included for further enhancing the study of the Catawba River. Sources of information are listed where known.

1. Conduct an imaginary raft or canoe trip down the Catawba - what industries would you see? Put the raft back in time to 1970's - what would you expect to see?

2. Study the biota of the river - microscopic and macroscopic. (contact Duke Power, Educational Services, (704) 373-8537) or P. O. Box 33189, Charlotte, N. C. 28242

3. Obtain large scale state maps and place power plants and other industries on the map at appropriate places.

4. Study The Catawba Indians and the impact the river had on them (The Catawba Indians: The People of the River, Douglas S. Brown, USC Press, 1966)

5. Study Duke Power as a company - a film "Impossible Is Not An American Word" and a written history are available from Duke Power Ed. Services (704) 373-8537 or P. O. Box 33189, Charlotte, N. C. 28242.

ANSWER SHEET - RAINDROPS

Choose the one best answer from among the choices listed.

1. X b
2. a b X d
3. a b X d
4. a b c X
5. a X c d
6. X b c d
7. a X
8. X b c d
9. a X c d
10. a b c X
11. a b X d
12. a X c d
13. a b X d
14. X b c d
15. a b X d
16. a b c X
17. X b
18. a X
19. X b c d
20. a b X d

NOTE: ANSWERS NEED NOT BE IN ANY ORDER

	Basin	Plant	Fuel Type
ex. 1	Dan	Dan River	Coal
2	DAN	RELEWS CREEK	COAL
3	Yadkin	BUCK	COAL
4	Catawba	BRIDGEWATER	HYDRO
5	CATAWBA	RHODHISS	HYDRO
6	CATAWBA	OXFORD	HYDRO
7	CATAWBA	LOOKOUT SHOALS	HYDRO
8	CATAWBA	MARSHALL	COAL
9	CATAWBA	COWANS FORD	HYDRO
10	CATAWBA	RIVERBEND	COAL
11	CATAWBA	MOUNTAIN ISLAND	HYDRO
12	CATAWBA	ALLEN	COAL
13	CATAWBA	CATAWBA	NUCLEAR
14	CATAWBA	McGUIRE	NUCLEAR
15	CATAWBA	WYLIE	HYDRO
16	CATAWBA	FISHING CREEK	HYDRO
17	CATAWBA	GREAT FALLS	HYDRO
18	CATAWBA	DEARBORN	HYDRO
19	CATAWBA	ROCKY CREEK	HYDRO
20	CATAWBA	CEDAR CREEK	HYDRO
21	CATAWBA	WATEREE	HYDRO
22	Broad/Saluda	TUXEDO	HYDRO
23	BROAD/SALUDA	TURNER	HYDRO
24	BROAD/SALUDA	CLIFFSIDE	COAL
25	BROAD/SALUDA	GASTON SHOALS	HYDRO
26	BROAD/SALUDA	CHEROKEE	NUCLEAR
27	BROAD/SALUDA	NINETY-NINE ISLANDS	HYDRO
28	BROAD/SALUDA	SALUDA	HYDRO
29	BROAD/SALUDA	LEE	COAL
30	BROAD/SALUDA	HOLLIDAY'S BRIDGE	HYDRO
31	BROAD/SALUDA	BUZZARD'S ROOST	HYDRO
32	Upper Savannah	JOCASSEE	HYDRO(pumped stor.)
33	UPPER SAVANNAH	OCONEE	NUCLEAR
34	UPPER SAVANNAH	KEOWEE	HYDRO

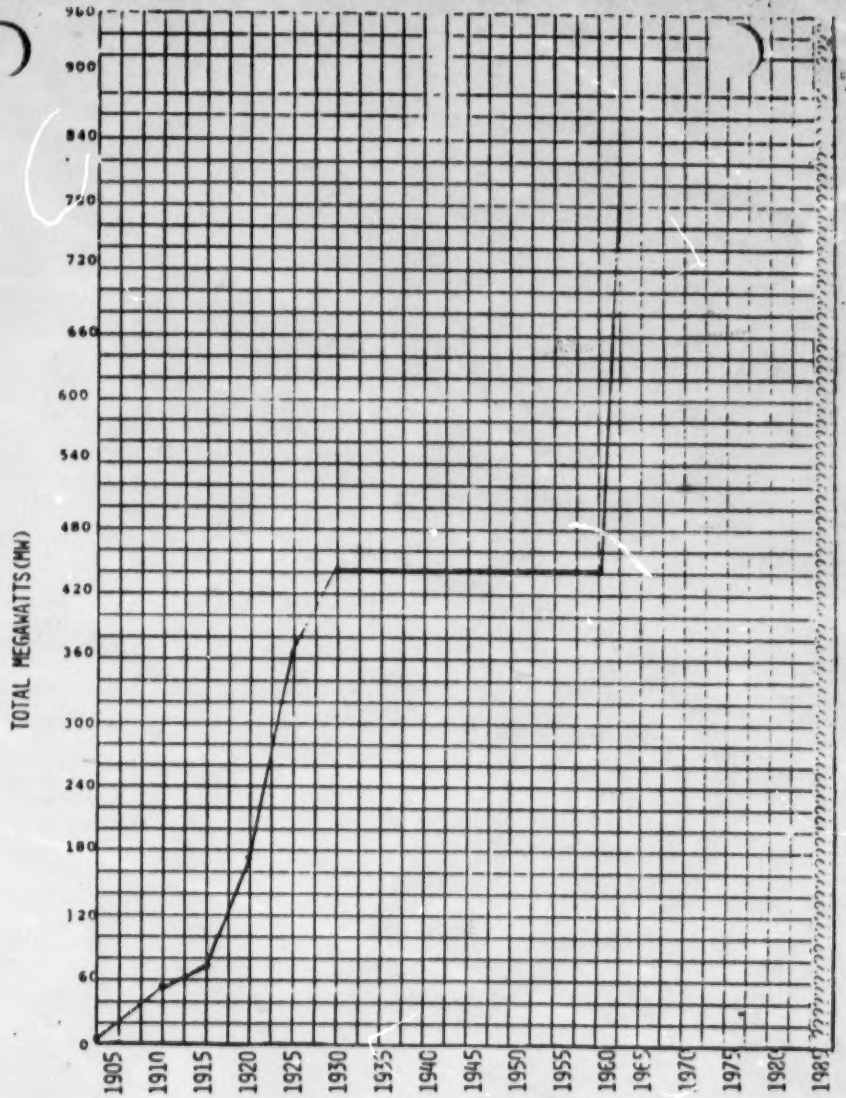
Total Hydro: 11 Total coal 1 Total nuclear 1

WORKSHEET - RIVER RUNS

	Dam	Depth at Dam (ft.)	Back-up Distance (miles)
ex 1.	Bridgewater	130	14
2.	Rhodhiss	70	10.7
3.	Oxford	92	17
4.	Lookout	78	10
5.	Cowans Ford	112	32
6.	Mountain Island	78	11
7.	Wylie	75	28
8.	Fishing Creek	61	14
9.	Great Falls-Dearborn	71	3
10.	Rocky Creek Cedar Creek	60	7
11.	Wateree	83	22

* Problems *

1. How much higher is the dam at Bridgewater than the dam at Wateree?
   58 ft.
2. How much longer is the back-up at Cowans Ford than Fishing Creek?
   18 mi.
3. Assume the river bed is a constant slope. What would be the height of a dam at Watree to impound water at the same depth as now in the upper reaches of Bridgewater? Add the heights of the existing dams as you determined them above. Does this calculation equal your pretend calculation? Explain.
   height= 1057 ft. adding heights= 910 ft. DIFFERENCE = 146 ft.
   EXPLANATION: stretches of the river that have no dams.



"Magic Square"

DIRECTIONS: Select from the answer column at the left the word or phrase which best defines or answers each of the statements at the right. Put the number of the word in the proper space in the Magic Square box. If your answers are correct, they will form a square in which the numbers in both columns and rows are equal.

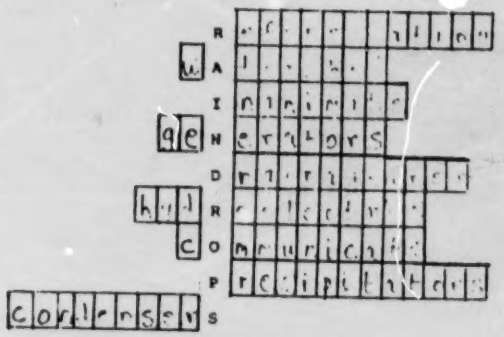
1. inanimate	A. person who studies water
2. communicate	B. devices used to cool steam
3. efficiency	C. devices used to produce electric current
4. watershed	D. talk, be in touch
5. hydroelectric	E. devices used to remove flyash
6. generators	F. area from which a river or lake water comes
7. peaking power	G. process of replanting trees
8. condensers	H. power needed at highest demand levels
9. precipitators	I. electricity produced by falling water
10. limnologists	
11. waterfowl refuge	
12. reforestation	
13. drainage area	

A 10	B 8	C 6
D 2	E 9	F 13
G 12	H 7	I 5

Magic number is: 24

Word Puzzle

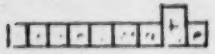
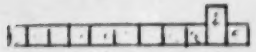
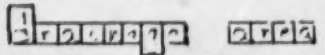
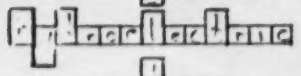
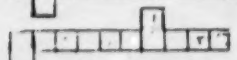
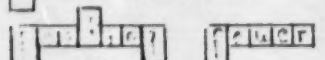
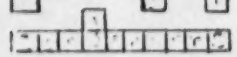
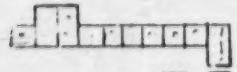
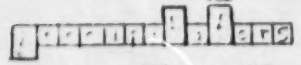
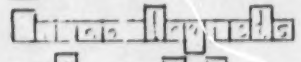
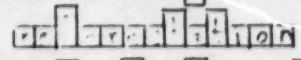
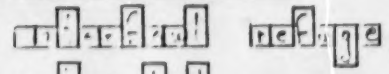
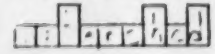
DIRECTIONS: From the word list below, fill in the proper words in the word puzzle to complete the boxes.



inanimate
communicate
watershed
drainage area
hydroelectric
generators
peaking power
condensers
efficiency
precipitators
limnologists
reforestation
waterfowl refuge

CONFIGURATION

DIRECTIONS: Discover the facts about some of the "Raindrops" vocabulary by matching the names to the description and the boxes designed for their shapes.

1.  not alive
2.  to talk
3.  section in which water flows to a particular lake.
4.  using water to generate electricity
5.  produces electricity
6.  energy for very highest demands
7.  devices to cool steam
8.  ratio of work in to work out
9.  devices to remove fly ash from smoke gases
10.  people who study fresh water
11.  process of replanting trees
12.  site where water birds are protected
13.  area from which a river's water comes

Word list:

communicate
condensers
drainage area
efficiency
generators
hydroelectric
inanimate
limnologists
peaking power
precipitators
reforestation
waterfowl refuge
watershed

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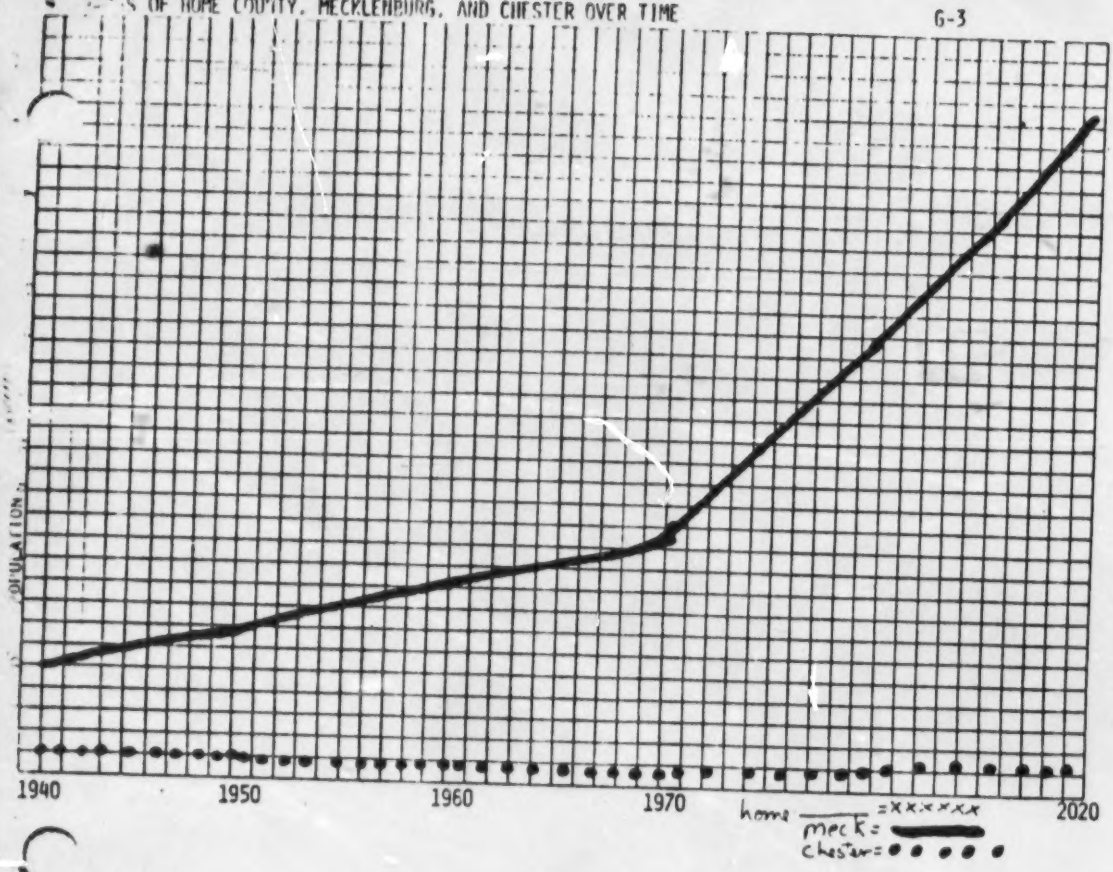
DIRECTIONS: Each of the jumbled words below deals with the film "Raindrops." The short definitions beside the jumble should help you unjumble the words.

1. Taenanii: inanimate not alive
2. Sednernocs: condensers devices to cool steam
3. Ronratgess: generators produces electricity
4. Dehsretav: watershed - area from which a river's water comes
5. Chiyrdtrcoeel: hydroelectric electricity from water
6. Tatfersernooi: reforestation replanting trees
7. Fyenccilfe: efficiency - ratio of output to input
8. Srotaterpicpi: precipitators devices to remove flyas
9. Stsigolonmil: limnologists people who study water
10. Kingpea Rewop: peaking power power for highest demands
11. Egdrnaia aera: drainage area synonym of #4
12. Lofwertaw gefure: waterfowl refuge safe place for water birds
13. Etacinummoc: communicate to talk

S OF HOME COUNTY, MECKLENBURG, AND CHESTER OVER TIME

G-3



COUNTY POPULATIONS (1970 AND 2020)

G-2